Rupture along the lines of greatest tension in shearing may be well illustrated by pasting a piece of paper over two flat boards, with straight parallel edges, about $\frac{1}{4}''$ apart; if now, preserving this distance, the boards are forced to move past one another in the direction of their edges, folds appear in the paper parallel to the lines of greatest tension, and if the sliding be continued the paper tears at right angles to the direction of the folds (fig. 15).

VII. On Seismic Experiments." By John Milne, F.G.S., and Thomas Gray, B.Sc., F.R.S.E. Communicated by A. C. Ramsay, LL.D., Director-General of the Geological Survey and of the Museum of Economic Geology. Received November 5, 1881.

(Abstract.)

This paper is an account of a series of experiments made at the Akabane Engineering Works, Tokio, for the purpose of investigating some points connected with earthquake motion. The mode of experiment consisted in creating a disturbance at a point on the earth's surface by allowing a heavy block of iron (1,710 lbs.) to fall from a height (35 feet), and observing the resulting motion produced in the earth at points variously situated relatively to the centre of disturbance. The centre of disturbance was situated near to one corner of a pond about 10 feet deep, and close to the foot of a small steep hill, the remaining ground being very nearly level, and composed of hardened mud, which extended to a depth of from 20 to 30 feet. The configuration of the ground here briefly described is clearly shown by means of a map accompanying the complete paper. In the earlier experiments a number of similar vessels of mercury were placed at the different points, and the vibrations produced on the surface taken as a rough indication of the intensity of the disturbance at the point. This method of observation showed with considerable definiteness where the motion became insensible. These preliminary experiments showed that the disturbance could be distinctly propagated to a distance of 650 feet (which was the greatest distance available); that the pond cut off the disturbance from points beyond its distant side if these points were sufficiently removed from the corner, but that the hill did not cut off the vibrations.

In subsequent experiments more definite observations were made by using seismographic apparatus, and by this means the following conclusions were reached.

A disturbance emanating from a centre as above described, produced at least two distinct sets of vibrations. One of these sets has

the direction of motion in the line joining the centre of disturbance and the point of observation, while the other set has the direction of motion at right angles to that line. The first of these is denominated the direct wave, and the second the transverse wave. The direct wave has a greater amplitude and a slightly shorter period of motion at the source, but seems to die out more rapidly than the transverse wave. The amplitude of the direct vibrations seems never to have exceeded 0·5 millim. at 50 feet, and 0·1 millim. at 250 feet from the centre. The amplitude of vibration was very nearly inversely as the distance from the source. The direct wave was completely cut off by the pond and nearly, if not completely, by the hill, but the transverse wave extended along the distant side of the pond to a considerable distance, and was little affected by the hill. When the motion of a point on the earth's surface was registered by means of a seismograph, it was found to be such as would result from the composition of two harmonic motions of different period, and in different directions. One of the most important points attended to in these experiments was the determination of the velocity of propagation for the different waves. The method finally adopted for this purpose was to mark by means of a telegraphic arrangement, simultaneously, and at definite intervals, on two smoked glass plates, placed at different distances along the same line from the source, the same instant of time. These plates were moved by clockwork, and were used for the reception of the seismograph record.

It is evident that the time-marks on the plate give the means of comparing the times of arrival of the direct, or the transverse wave, according to circumstances at the two stations, and hence, knowing the time-interval between the marks on the plates, the velocity of propagation could readily be calculated.

As the result of these observations the surprisingly low velocity of 438 feet per second for the direct, and 357 feet per second for the transverse wave, was obtained. The soft nature of the material through which the disturbance was propagated is given as the probable reason for this result.

The results of similar experiments by Mr. Robert Mallet, at the Hellgate explosions, in New York Harbour, are referred to. At the conclusion of the paper an example of the records obtained in actual earthquakes is given and briefly described.

VIII. "On the Electrolytic Diffusion of Liquids." By G. Gore, LL.D., F.R.S. Received November 8, 1881.

In a paper on the "Influence of Voltaic Currents on the Diffusion of Liquids" ("Proc. Roy. Soc.," vol. 32, 1881), I described a number